

Causes, Trends and Long Term Consequences of Leg Injury

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Lower extremity injuries are frequent.

Linkage of Police Report and Hospital Discharge Records (1994-1996)

545,105 total crash reports
for MV drivers
(**451,194** with valid,
DOB, sex, accident date)

131,191 hospital discharge
records identifying injury
(ICD 800-959)

Merge by DOB, Sex, Admission
and Crash within 1 day, E-code=MVA

8,452

Non-rollover, body types include
automobile, limousine, station
wagon, light truck, MPV, and van

7,669

Incidence of Specific Fractures

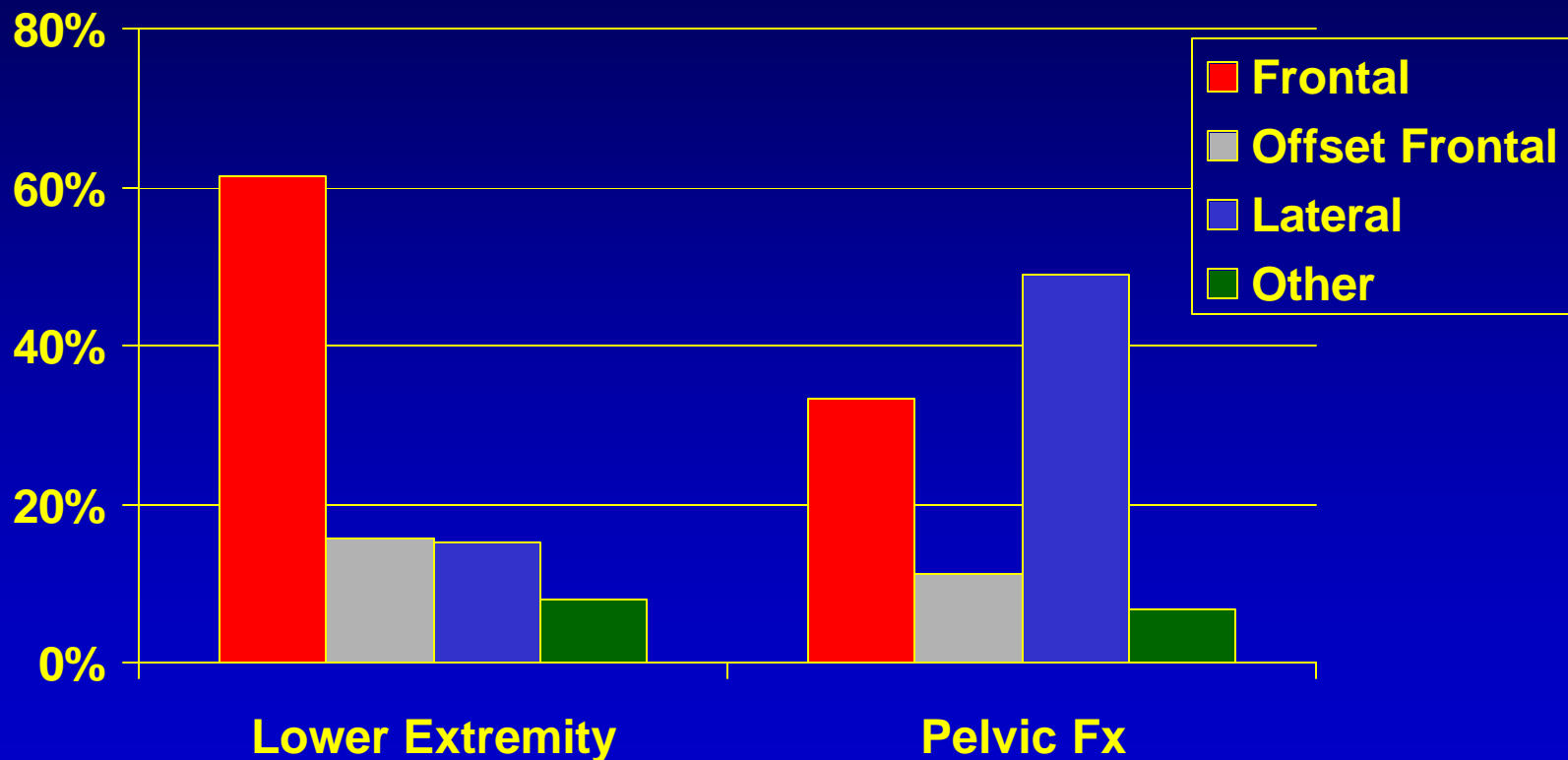
(N=7,669)

	Men (%)	Women (%)	p-Value
Pelvis	5.5	7.6	p<0.001
Femur	5.5	4.7	
Patella	1.8	2.7	p=0.007
Tib/Fib	4.2	4.8	
Ankle	3.9	7.3	p<0.001
Tar/Met	3.2	5.4	p<0.001
Other	0.4	0.4	

Motor vehicle crash-induced lower extremity injuries will probably become relatively more important.

Pelvic and Lower Extremity Fractures

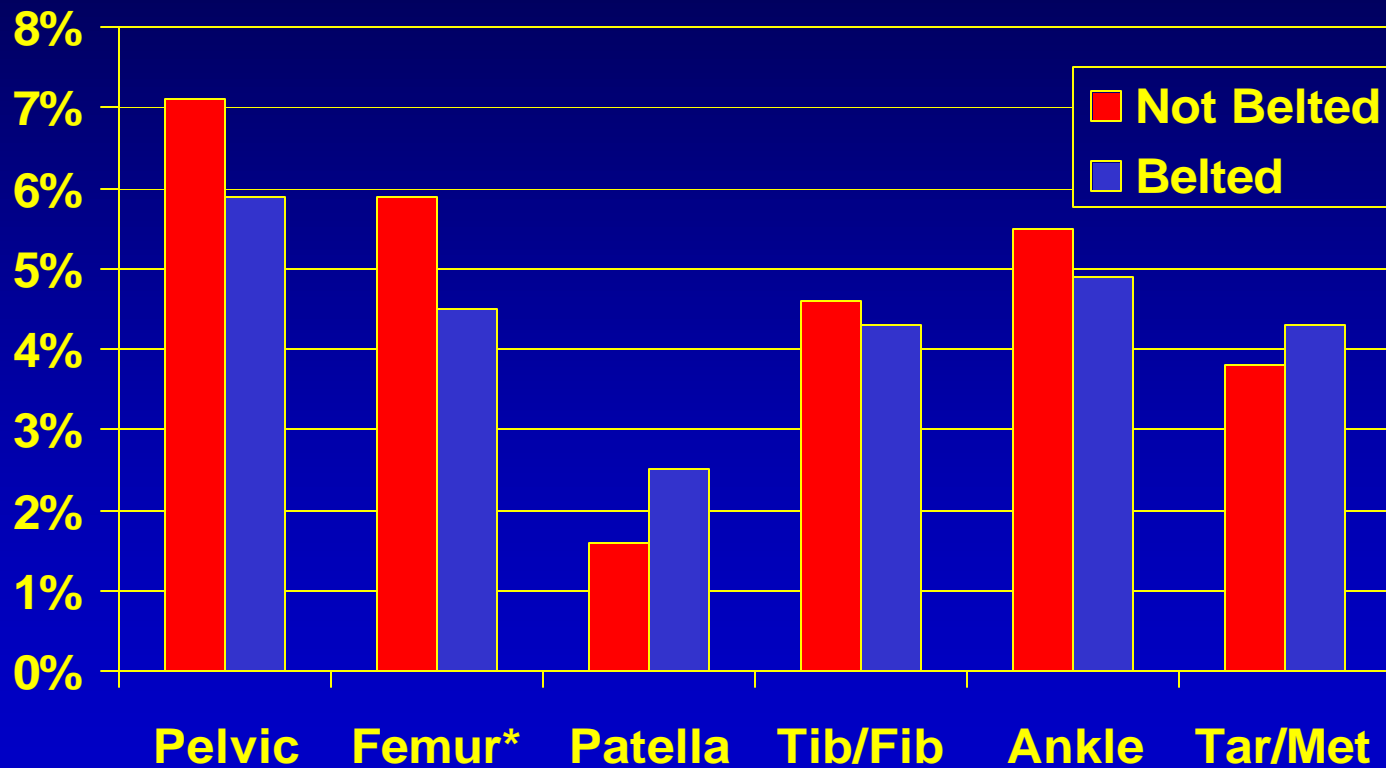
Point of Impact (N=7,669)



$P < 0.001$

Lower Extremity Fractures

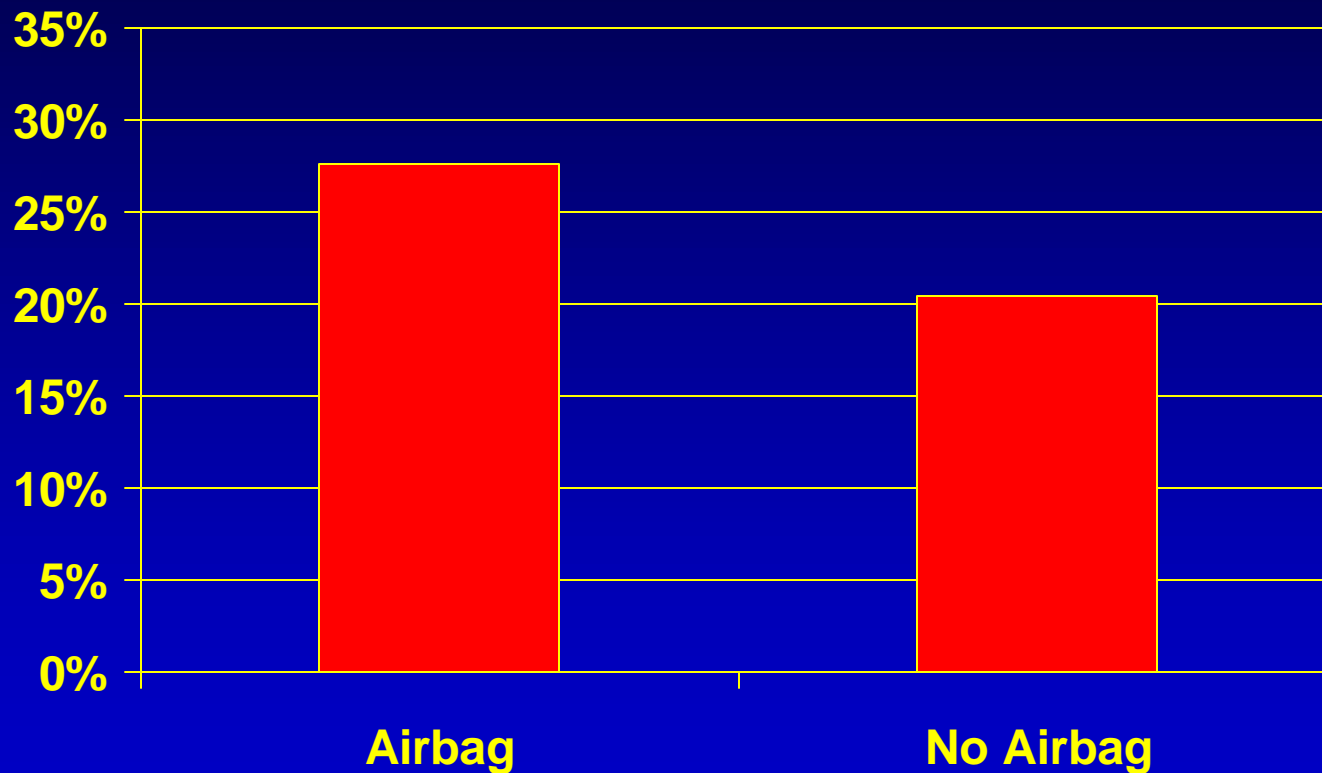
Reported Belt Use (N=7,669)



* P= 0.018

Lower Extremity Fractures by Airbag

Frontal Collision Only (n=4,887)



P=0.005

Lower extremity injuries are costly.

Mean ISS, Hospital Length of Stay and Charges by Airbag Use (Frontal Collision Only)

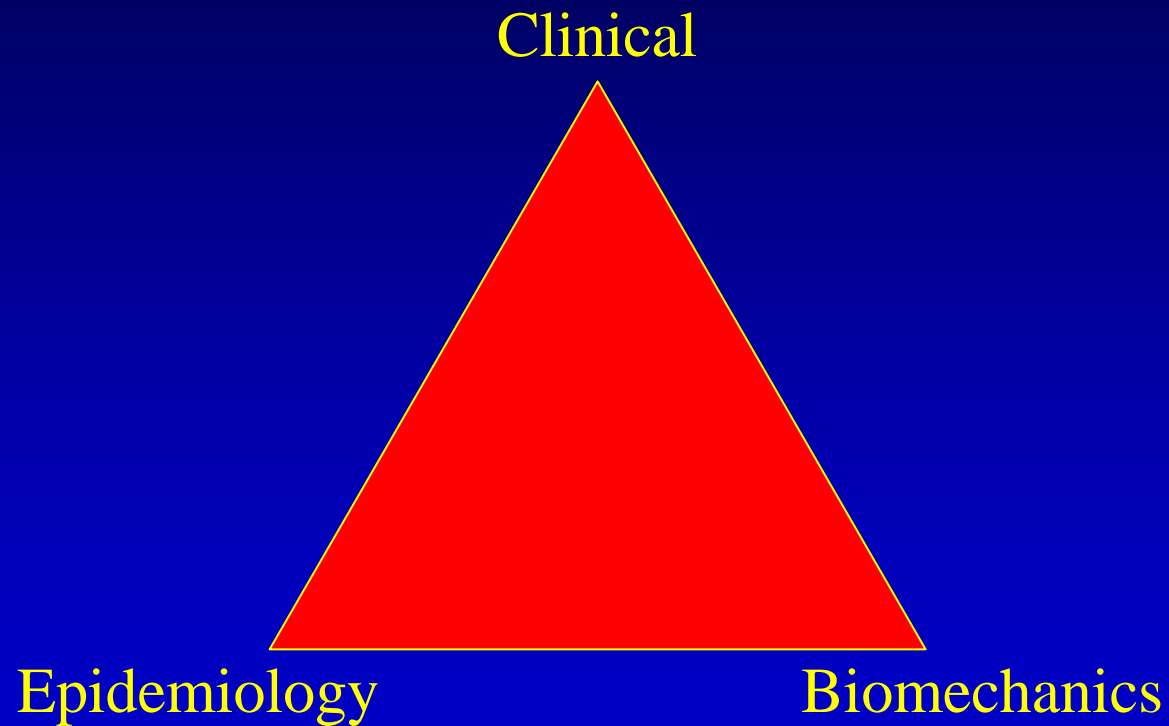
	Airbag (n=261)	No Airbag (n=4626)	p- value	Total (n=4887)
Mean ISS	7.1	7.3	NS	7.3
Mean LOS (days)	4.7	4.2	NS	4.2
Mean \$	10,542	9,099	NS	9,176

Mean ISS, Hospital Length of Stay and Charges by Lower Extremity Fracture (Frontal Collision Only)

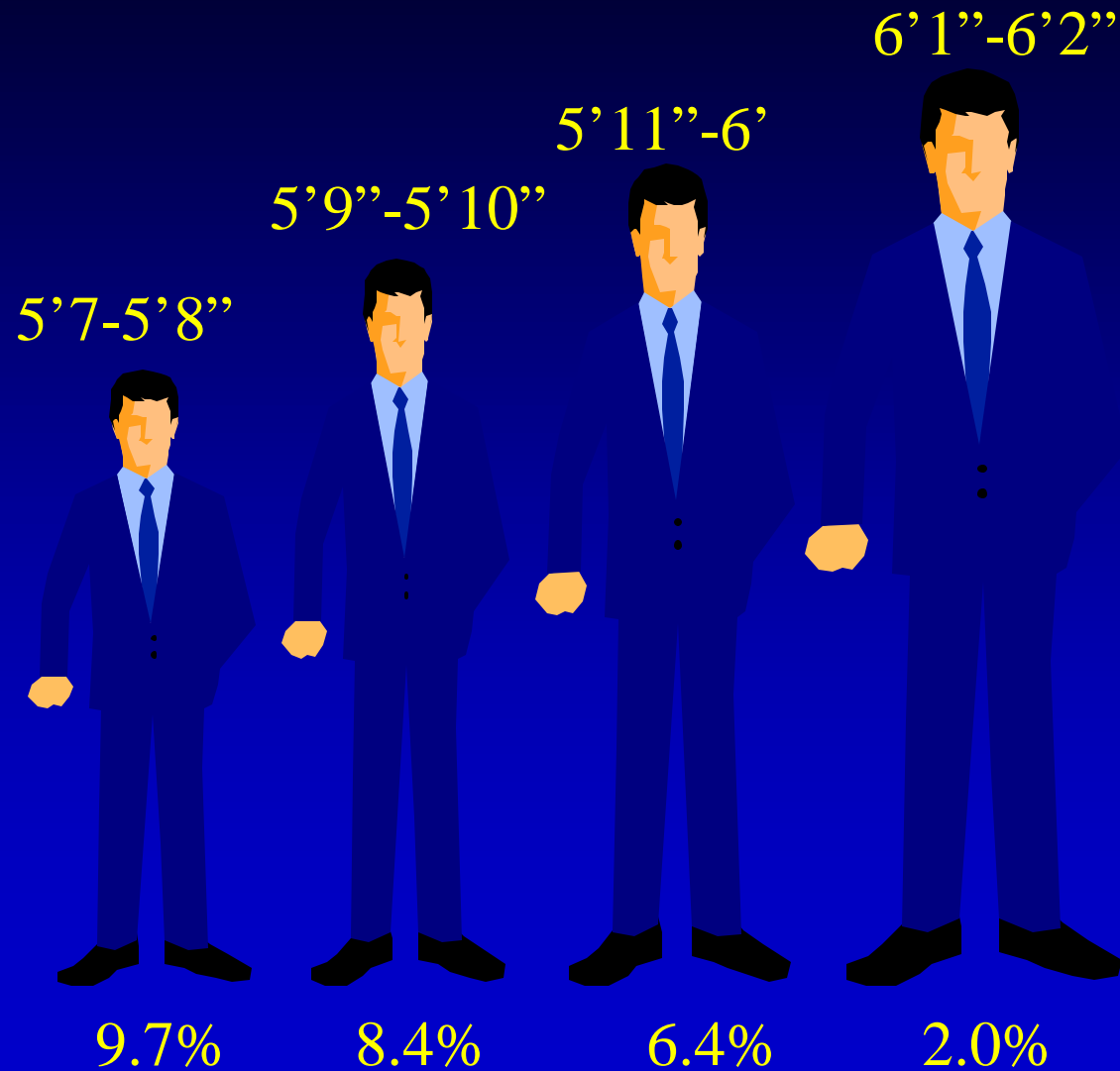
	Lower ext fracture (n=1,016)	No lower ext fracture (n=3,871)	p-value	Total (n=4,887)
Mean ISS	10.1	6.5	<0.001	7.3
Mean LOS (days)	7.9	3.2	<0.001	4.2
Mean \$	18,371	6,762	<0.001	9,176

**Lower extremity injuries sustained
in motor vehicle crashes are disabling.**

Multidisciplinary Approach to Motor Vehicle Injuries

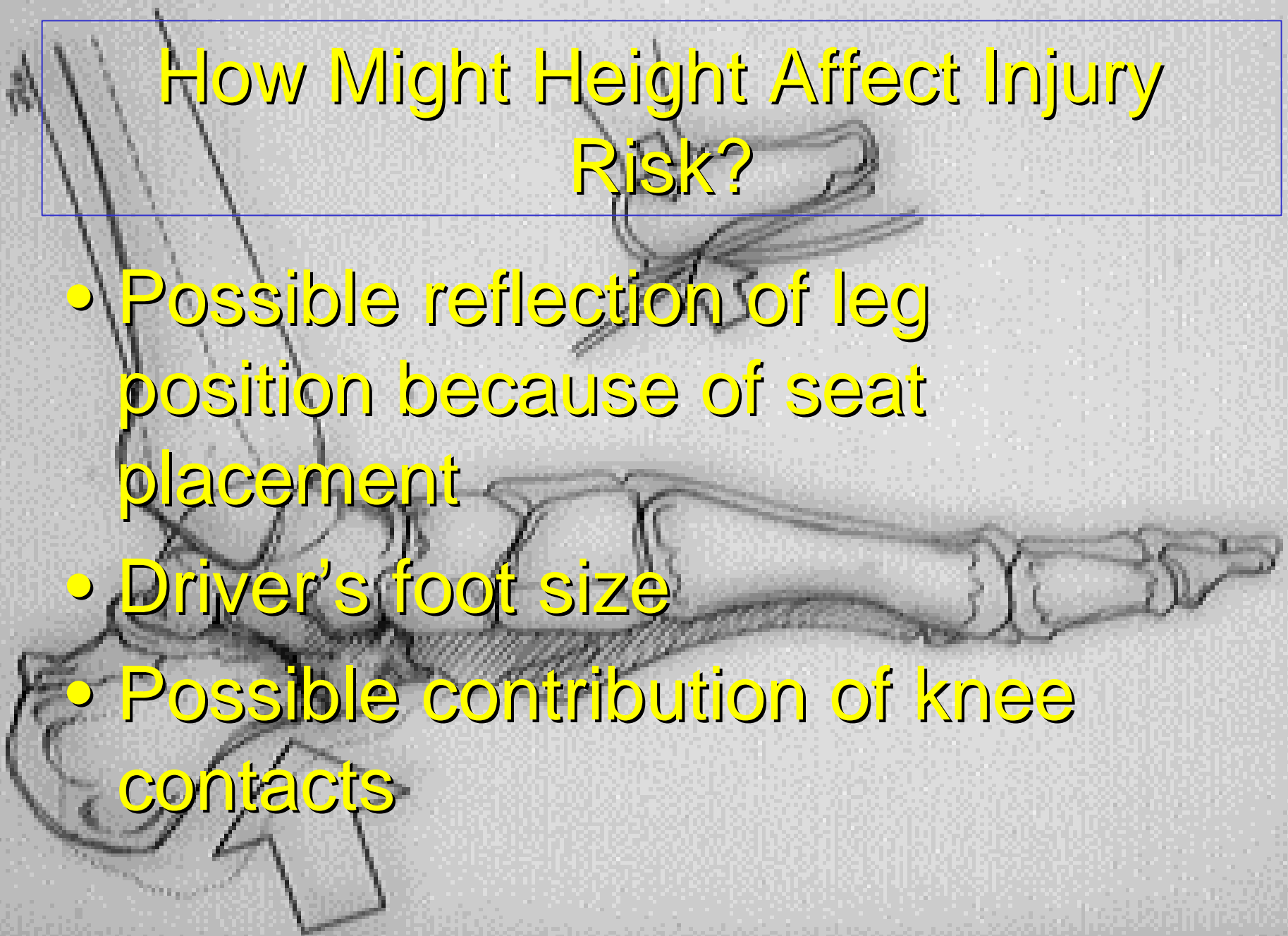


Incidence of Ankle/Tarsal Injury in Males



How Might Height Affect Injury Risk?

- Possible reflection of leg position because of seat placement
- Driver's foot size
- Possible contribution of knee contacts

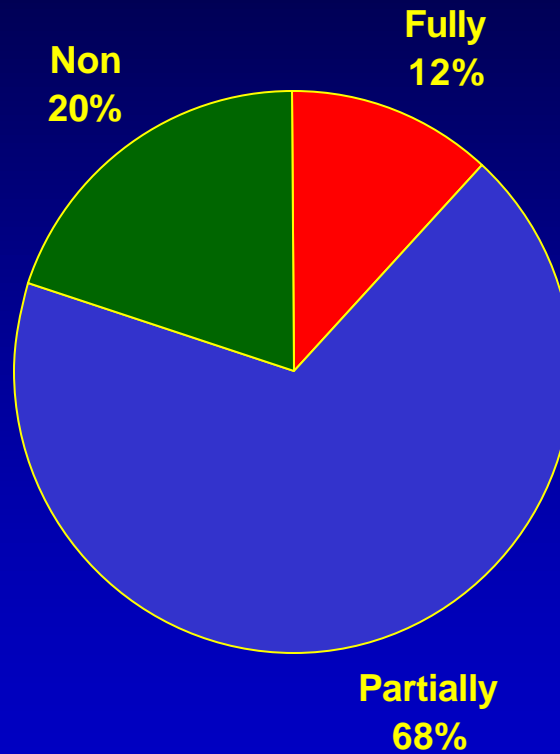


After the injury...

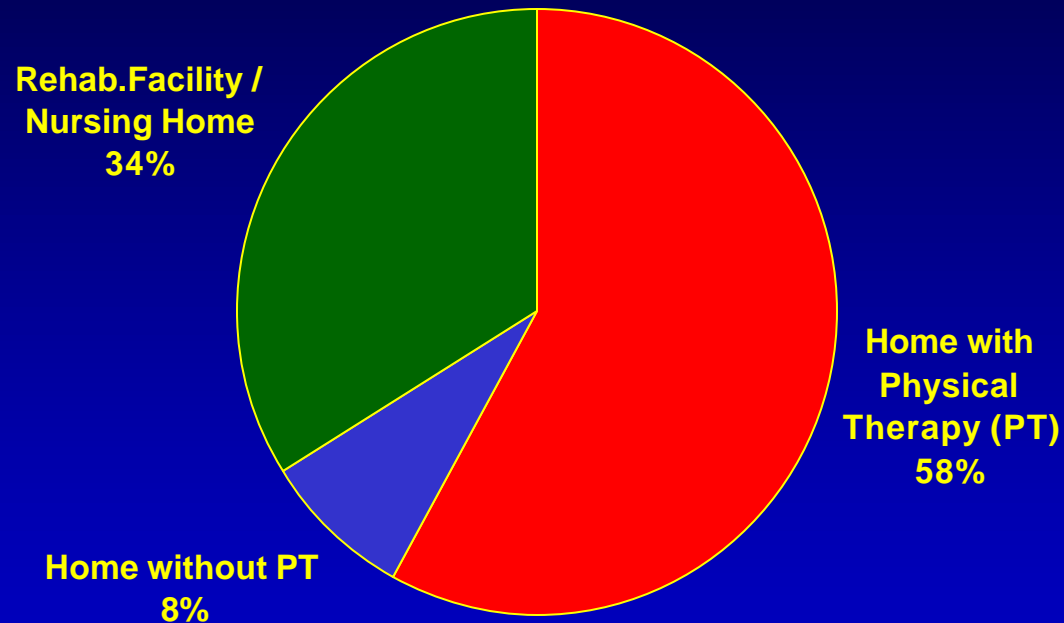
Patient Characteristics

Male	38.5%
White	84.6%
Age (Mean)	38.3 years
Married	34.6%
High School Graduate	73.1%
CAGE Alcohol 2+	34.6%

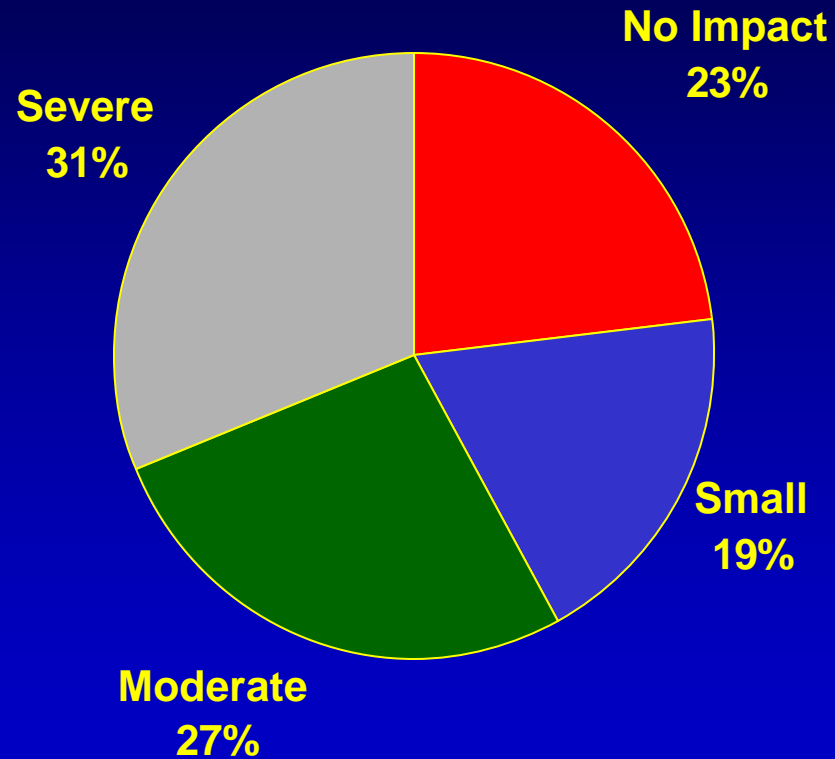
Weight-bearing Status



Hospital Discharge Disposition



Financial Impact

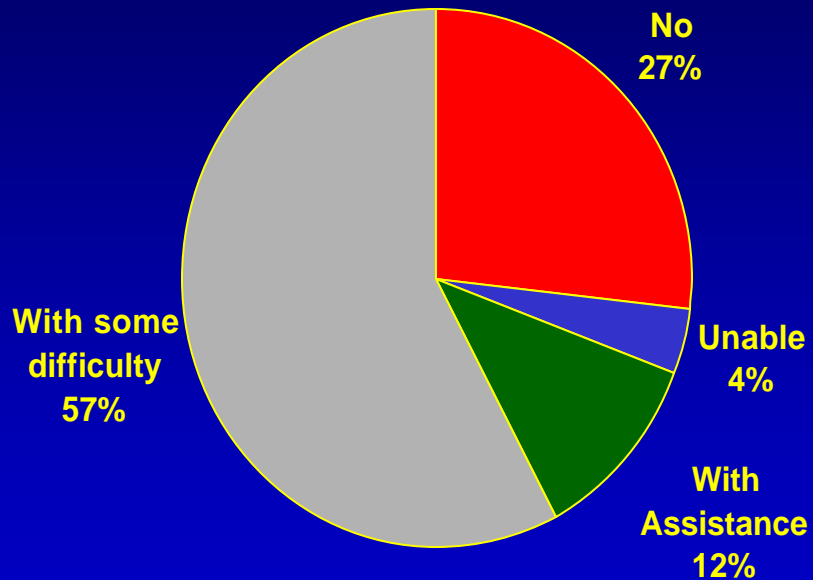


Six-month Patient Charges

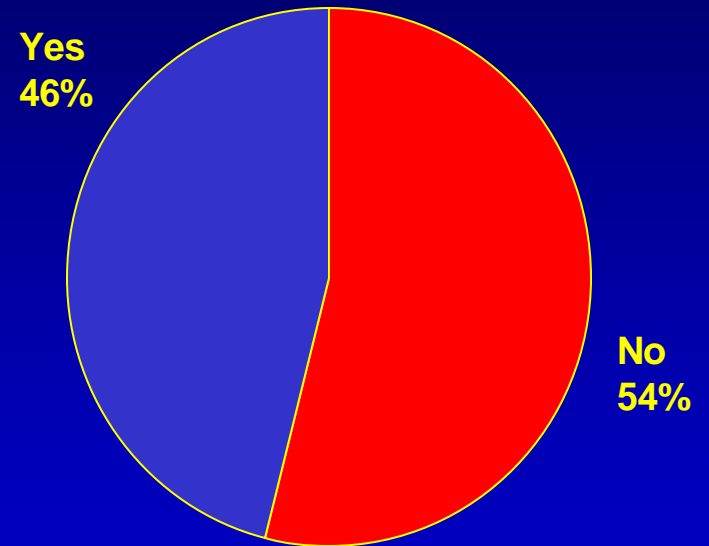
	<u>Mean</u>	<u>Range</u>
Hospital	\$ 42,459	\$ 2,466– \$ 109,900
Professional	\$ 12,234	\$ 231-- \$ 36,000
Total Hosp. + Prof.	<u>\$ 54,692</u>	<u>\$ 2,766– \$ 143,058</u>
Rehabilitation	\$ 10,609	\$ 200-- \$ 26,000

Ambulation Limitations

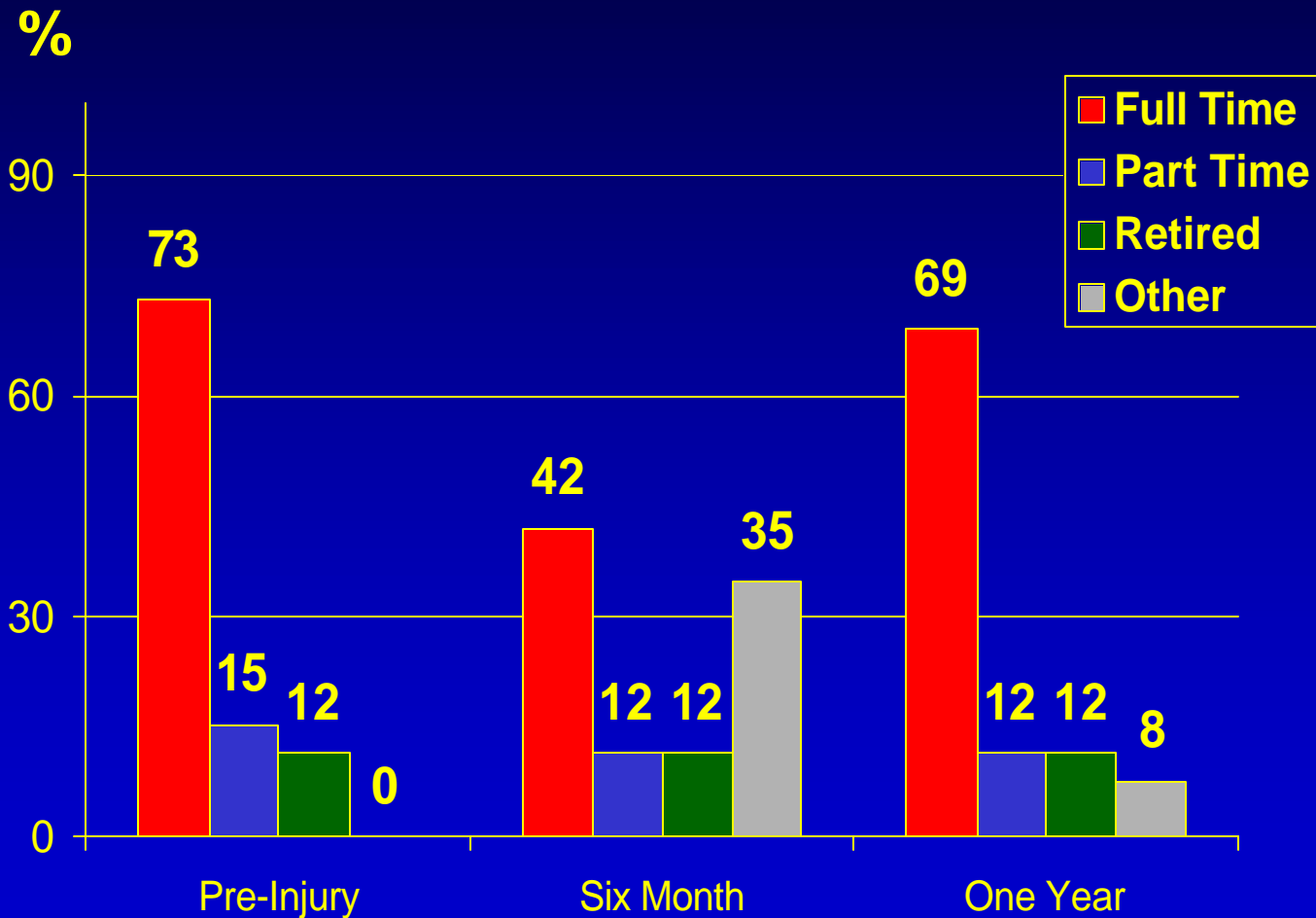
Six Month



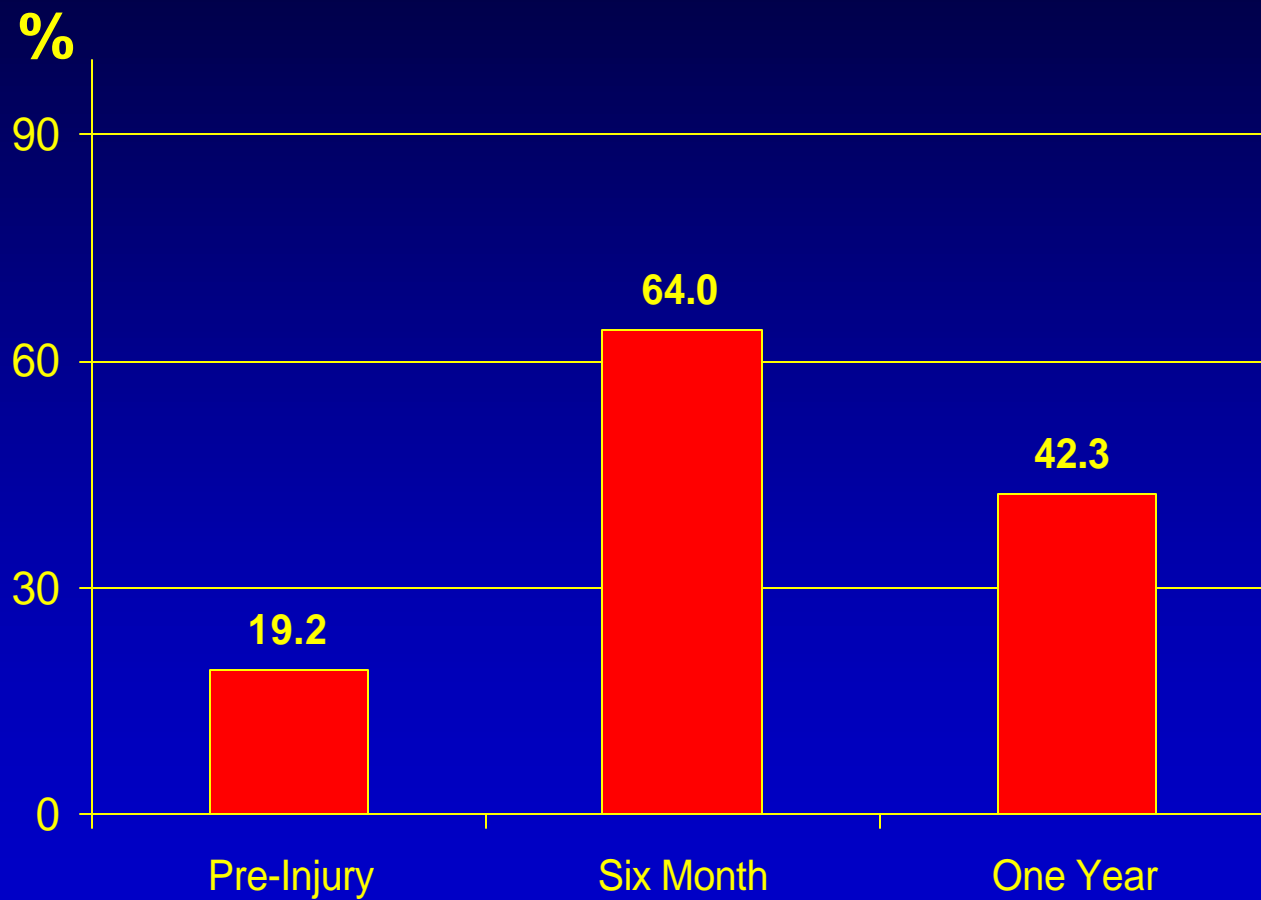
One Year



Employment/School Status



Depression/Anxiety



Follow-up Outcomes

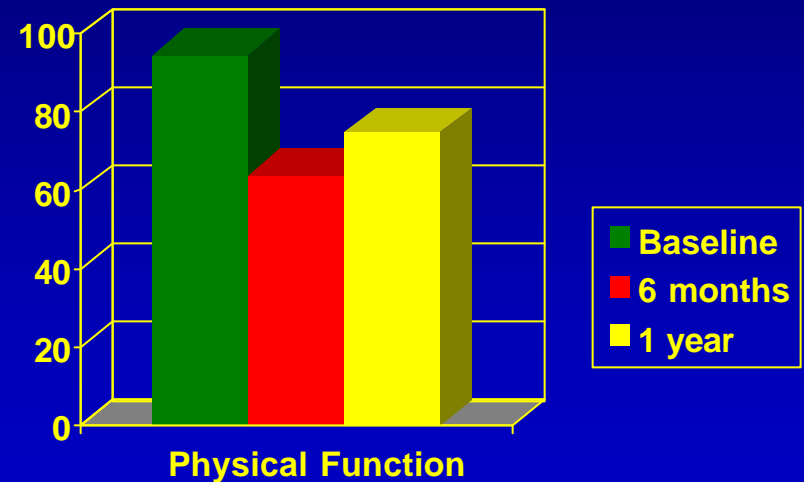
	<u>Six Month</u> %	<u>One Year</u> %
Behavioral Problem	50.0	23.1
Cognitive Problem	38.5	30.8
Pain Issues	76.9	61.5
Litigation	73.1	46.2
Return to Driving	73.1	88.5
Life Altering Experience	69.2	80.8

Post Trauma Stress Disorder

	<u>Six Month</u>	<u>One Year</u>
	%	%
Yes	46.2	38.5
Symptoms		
Re-Experiencing the event	53.8	34.6
Diminished Interest/ Emotional numbing	30.8	26.9
Concentration / Memory Problems	38.5	26.9
Hyper-Alertness	30.8	15.4
Sleep Disturbances	46.2	38.5

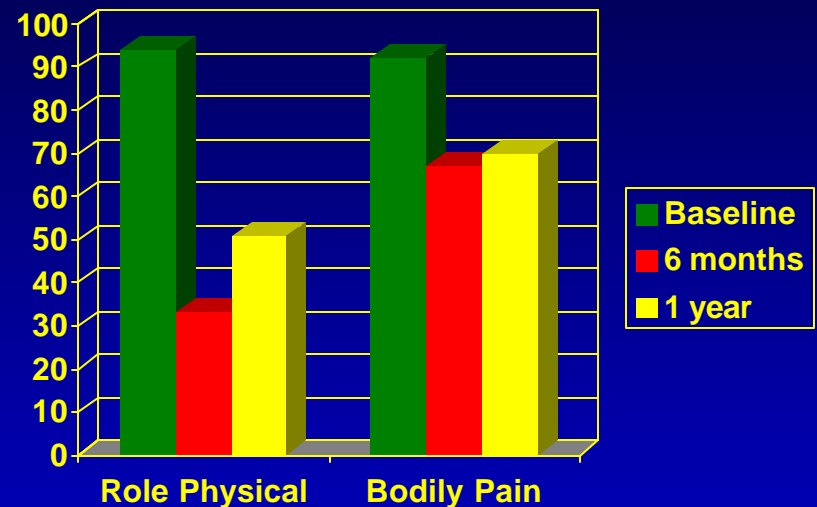
SF36 PHYSICAL FUNCTIONING (PF)

- Vigorous activities, such as running, lifting heavy objects, strenuous sports
- Moderate activities, such as moving a table, vacuuming, bowling
- Lifting or carrying groceries
- Climbing several flights of stairs
- Climbing one flight of stairs
- Bending, kneeling, or stooping
- Walking more than a mile
- Walking several blocks
- Walking one block
- Bathing or dressing



SF36 ROLE-PHYSICAL (RP)

- Cut down the amount of time spent on work or other activities
- Accomplished less than would like
- Limited in the kind of work or other activities
- Difficulty performing the work or other activities



(LACK OF) BODILY PAIN (BP)

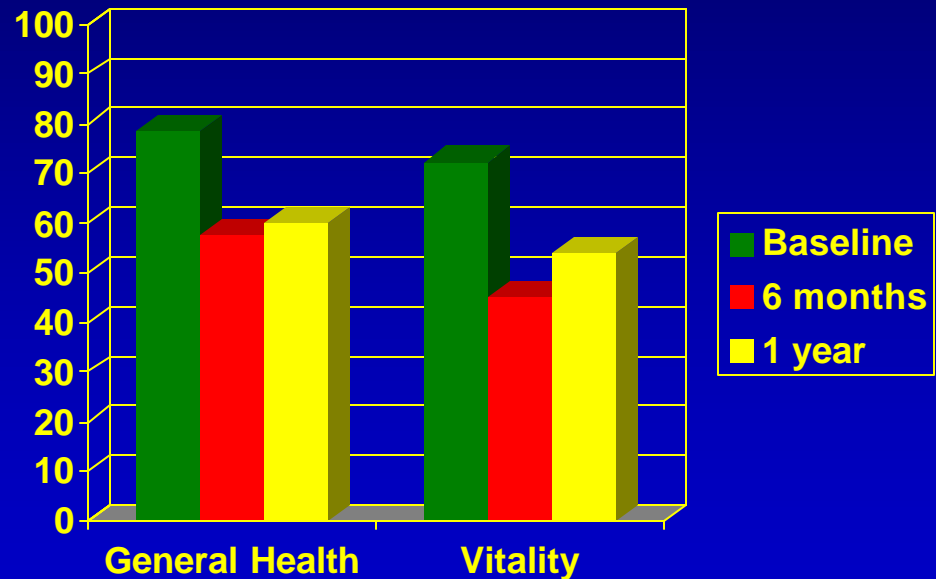
- Intensity of bodily pain
- Extent pain interfered with normal work

GENERAL HEALTH (GH)

- Is your health: excellent, very good, good, fair, poor
- I seem to get sick a little easier than other people
- I am as healthy as anybody I know
- I expect my health to get worse
- My health is excellent

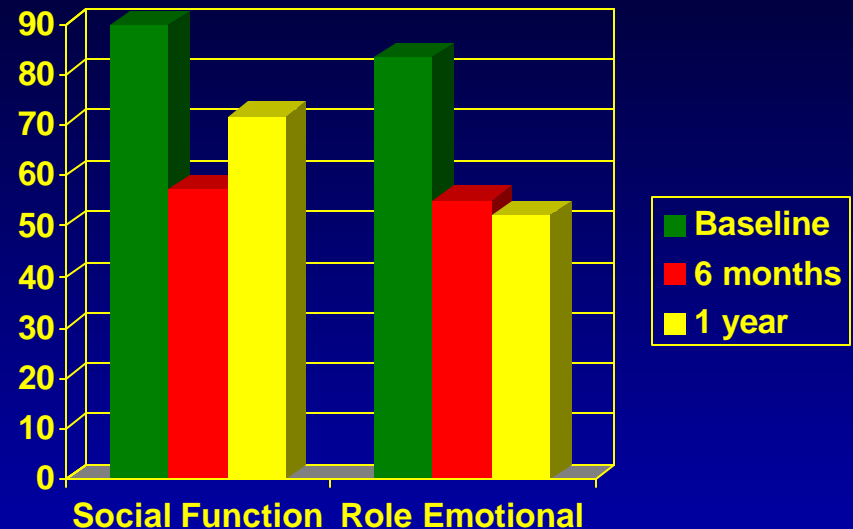
VITALITY (VT)

- Feel full of pep
- Have a lot of energy
- Feel worn out
- Feel tired



SOCIAL FUNCTIONING (SF)

- Extent health problems interfered with normal social activities
- Frequency health problems interfered with social activities

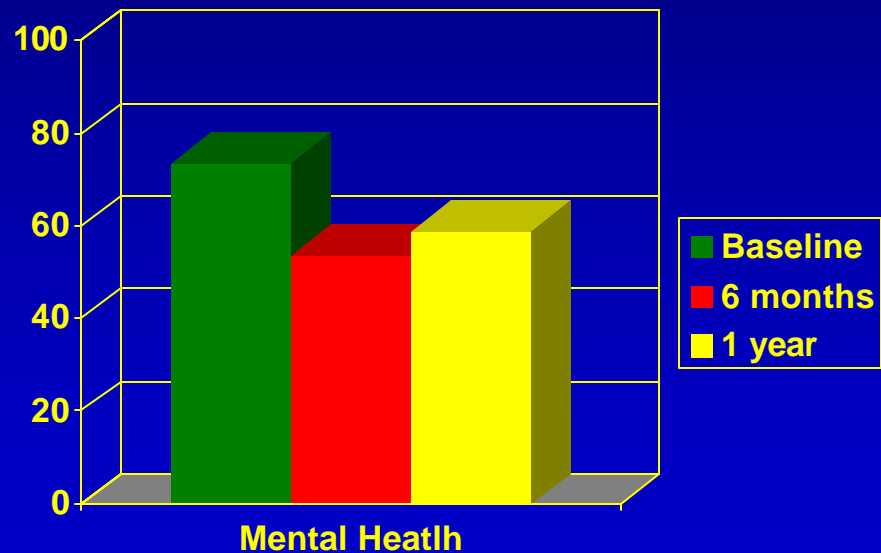


ROLE -- EMOTIONAL (RE)

- Cut down the amount of time spent on work or other activities
- Accomplished less than would like
- Didn't do work or other activities as carefully as usual

MENTAL HEALTH (MH)

- Been a very nervous person
- Felt “so down in the dumps” nothing could cheer you up
- Felt calm and peaceful
- Felt downhearted and blue
- Been a happy person



*So great a power is there of the soul upon the body,
that whichever way the soul imagines and dreams
that it goes, thither doth it lead the body* -Agrippa

Summary:

- Lower extremity injuries are quite disabling and have a major impact on quality of life
- Impact of injury not well reflected by ISS scores, which were designed to predict mortality
- With availability of seatbelts and airbags, the significance of these injuries will become more apparent

University Of Maryland
Medical System
National Study Center
for Trauma / EMS

CIREN



Vehicle 1 - Travel Path
(viewing NE)



Vehicle 1 - Travel Path and POI 1



Vehicle 1 – 1998 Dodge Neon



Vehicle 1 – Travel path from POI 1



Vehicle 1 – Travel path from POI 1
(viewing east)



POI 2 – 13" diameter tree



Vehicle 2 – Final resting place
(viewing south)



Delta V 45mph
PDOF 0 deg.
CDC 12FYEN3
Max Crush 22 inches @ C3



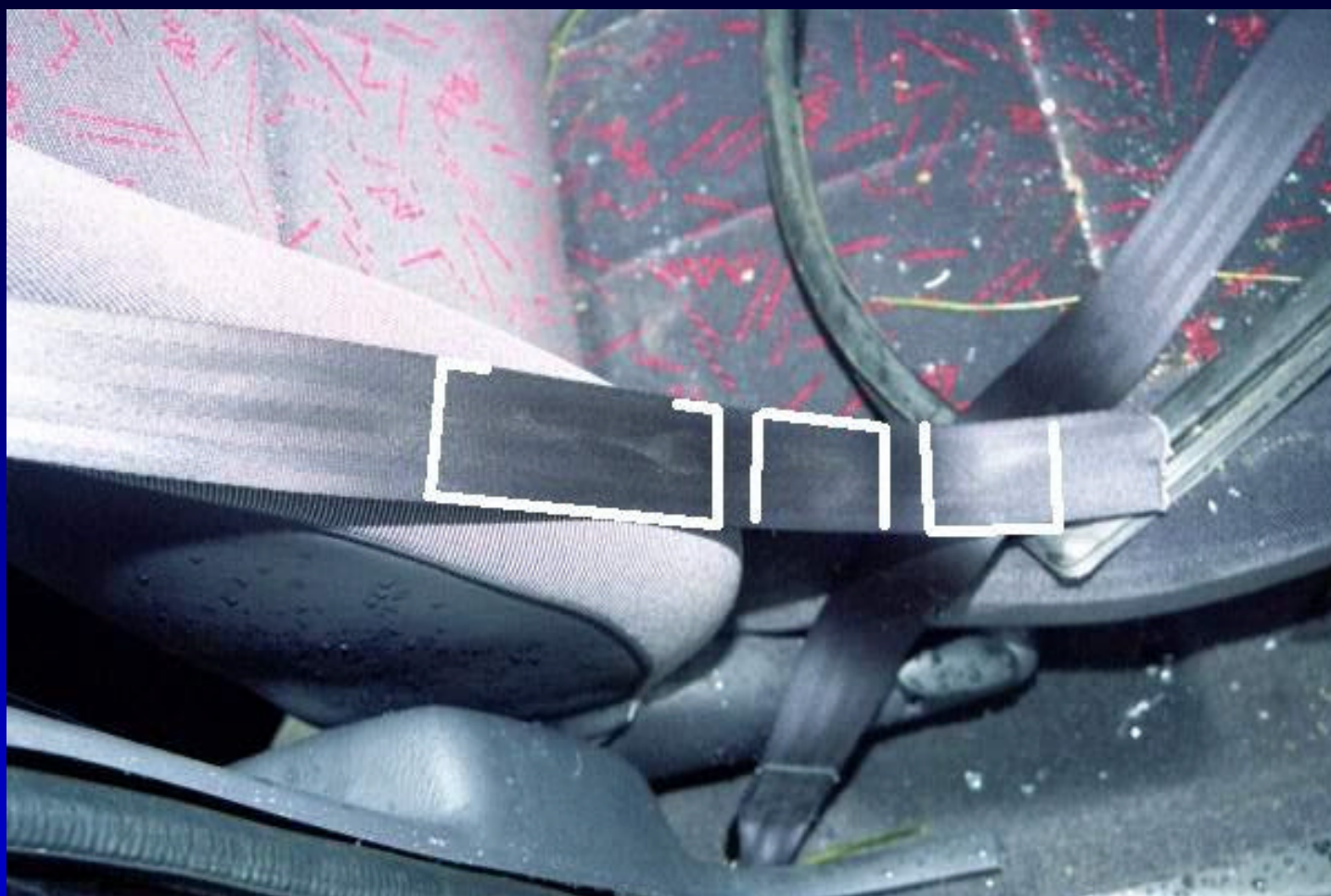
Vehicle 1 - Exterior



Vehicle 1 – Glove compartment/door contact
(R/F occupant)



Vehicle 1 – Center inst. panel contact
(R/F occupant)



Vehicle 1 – Right restraint load marks



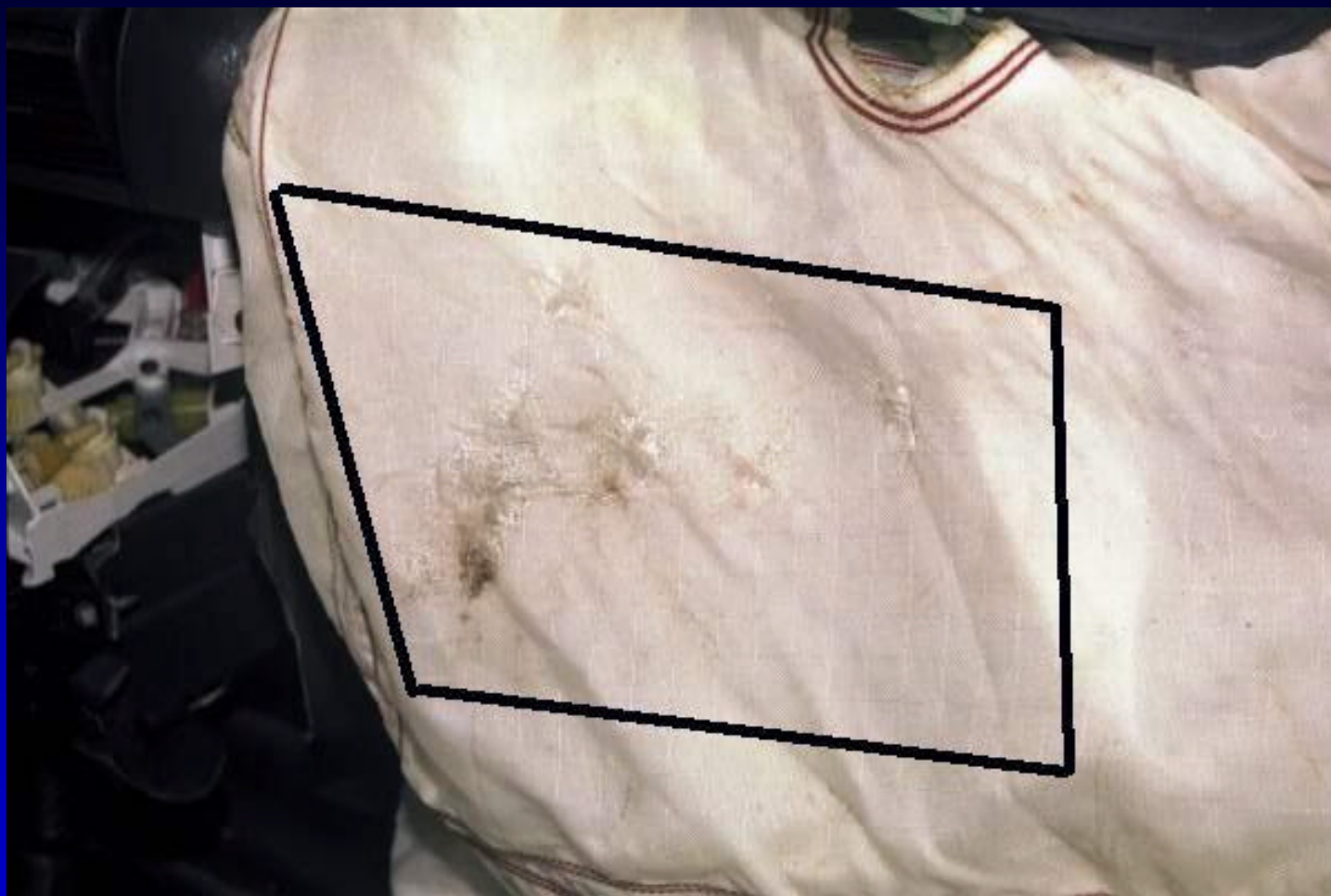
Vehicle 1 – Spare tire and right back seat



Vehicle 1 – Extra tire and left back seat



Vehicle 1 – Right front air bag



Vehicle 1 – Right front air bag
(Tire damage)

THE END